

WHAT IS CLAIMED IS:

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1. A method for manufacturing a semiconductor device comprising the steps of:
forming a semiconductor film comprising amorphous silicon over a substrate;
crystallizing said semiconductor film by irradiating a laser light;
forming an insulating film on the crystallized semiconductor film by a vapor phase deposition; and
thermal annealing said insulating film in an atmosphere comprising an oxygen gas.

2. The method of claim 1 wherein said thermal annealing step is performed at a temperature from 1000 to 1200°C.

3. The method of claim 1 wherein said vapor phase deposition is a plasma CVD and a low pressured CVD.

4. The method of claim 1 wherein said thermal annealing step is performed in order to reduce an interfacial layer density to 10^{11} cm^{-2} or lower.

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5. The method of claim 1 wherein said laser light is selected from the group consisting of KrF excimer laser, ArF excimer laser, XeCl excimer laser and XeF excimer laser.

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6. A method of manufacturing a semiconductor device comprising the steps of:
forming a semiconductor film comprising amorphous silicon over a substrate;
crystallizing said semiconductor film by irradiating a laser light;

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forming an insulating film comprising silicon oxide on the
crystallized semiconductor film by a vapor phase deposition; and
thermal annealing said insulating film in an atmosphere comprising
an oxygen gas.

5 7. The method of claim 6 wherein said thermal annealing step is
performed at a temperature from 1000 to 1200°C.

8. The method of claim 6 wherein said vapor phase deposition is a
plasma CVD and a low pressured CVD.

10 9. The method of claim 6 wherein said thermal annealing step is
performed in order to reduce an interfacial layer density to 10^{11} cm^{-2} or lower.

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10. The method of claim 6 wherein said laser light is selected from the
group consisting of KrF excimer laser, ArF excimer laser, XeCl excimer laser and
XeF excimer laser.

15 11. A method for manufacturing a semiconductor device comprising the
steps of:

forming a semiconductor film comprising amorphous silicon over a
substrate;

crystallizing said semiconductor film by irradiating a laser light;

20 forming an insulating film comprising silicon oxide on the
crystallized semiconductor film by a vapor phase deposition; and

thermal annealing said insulating film in an atmosphere comprising
an oxygen gas in order to reduce an interfacial layer density to 10^{11} cm^{-2} or lower.

12. The method of claim 11 wherein said thermal annealing step is
performed at a temperature from 1000 to 1200°C.

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13. The method of claim 11 wherein said vapor phase deposition is a plasma CVD and a low pressured CVD.

5 14. The method of claim 11 wherein said laser light is selected from the group consisting of KrF excimer laser, ArF excimer laser, XeCl excimer laser and XeF excimer laser.

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10 15. A method for manufacturing a semiconductor device comprising the steps of:
forming a semiconductor film comprising amorphous silicon over a substrate;
providing said semiconductor film with a crystallization promoting material;
crystallizing said semiconductor film by heating;
forming an insulating film on the crystallized semiconductor film by a vapor phase deposition; and
15 thermal annealing said insulating film in an atmosphere comprising an oxygen.

16. The method of claim 15 wherein said thermal annealing step is performed at a temperature from 1000 to 1200°C.

20 17. The method of claim 15 wherein said vapor phase deposition is a plasma CVD and a low pressured CVD.

18. The method of claim 15 wherein said thermal annealing step is performed in order to reduce an interfacial layer density to 10^{11} cm^{-2} or lower.

19. The method of claim 15 wherein said crystallization promoting material comprises a metal selected from the group consisting of Ni, Fe, Co, Ru, Rh, Pd, Os, Ir, Pt, Sc, Ti, V, Cr, Mn, Cu, Zn, Au and Ag.

5 20. A method for manufacturing a semiconductor device comprising the steps of:
forming a semiconductor film comprising amorphous silicon over a substrate;
providing said semiconductor film with a crystallization promoting material;
10 crystallizing said semiconductor film by heating;
forming an insulating film comprising silicon oxide on the crystallized semiconductor film by a vapor phase deposition; and
thermal annealing said insulating film in an atmosphere comprising an oxygen gas.

15 21. The method of claim 20 wherein said thermal annealing step is performed at a temperature from 1000 to 1200°C.

22. The method of claim 20 wherein said vapor phase deposition is a plasma CVD and a low pressured CVD.

20 23. The method of claim 20 wherein said thermal annealing step is performed in order to reduce an interfacial layer density to 10^{11} cm^{-2} or lower.

24. The method of claim 20 wherein said crystallization promoting material comprises a metal selected from the group consisting of Ni, Fe, Co, Ru, Rh, Pd, Os, Ir, Pt, Sc, Ti, V, Cr, Mn, Cu, Zn, Au and Ag.

25. A method for manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising amorphous silicon over a substrate;

5 providing said semiconductor film with a crystallization promoting material;

crystallizing said semiconductor film by heating;

forming an insulating film comprising silicon oxide on the crystallized semiconductor film by a vapor phase deposition; and

10 thermal annealing said insulating film in an atmosphere comprising an oxygen gas in order to reduce an interfacial layer density to 10^{11} cm^{-2} or lower.

26. The method of claim 25 wherein said thermal annealing step is performed at a temperature from 1000 to 1200°C.

27. The method of claim 25 wherein said vapor phase deposition is a
15 plasma CVD and a low pressured CVD.

28. The method of claim 25 wherein said crystallization promoting material comprises a metal selected from the group consisting of Ni, Fe, Co, Ru, Rh, Pd, Os, Ir, Pt, Sc, Ti, V, Cr, Mn, Cu, Zn, Au and Ag.

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